

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
28 October 2004 (28.10.2004)

PCT

(10) International Publication Number  
**WO 2004/091394 A3**

- (51) International Patent Classification<sup>7</sup>: **A61B 5/06, A61K 49/18**
- (21) International Application Number: **PCT/IB2004/050444**
- (22) International Filing Date: **15 April 2004 (15.04.2004)**
- (25) Filing Language: **English**
- (26) Publication Language: **English**
- (30) Priority Data:  
**03101017.6 15 April 2003 (15.04.2003) EP**
- (71) Applicant (for DE only): **PHILIPS INTELLECTUAL PROPERTY & STANDARDS GMBH [DE/DE];** Stein-  
damm 94, 20099 Hamburg (DE).
- (71) Applicant (for AE, AG, AL, AM, AT, AU, AZ, BA, BB, BE, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CY, CZ, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, SZ, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW only): **KONINKLIJKE PHILIPS ELECTRONICS N. V. [NL/NL];** Groenewoud-  
seweg 1, NL-5621 BA Eindhoven (NL).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **GLEICH, Bern-  
hard [DE/DE];** c/o Philips Intellectual Property &  
Standards GmbH WeissHausstr. 2, 52066 Aachen (DE).  
**WEIZENECKER, Jürgen [DE/DE];** c/o Philips Intellec-  
tual Property &, Standards GmbH WeissHausstr. 2, 52066  
Aachen (DE).
- (74) Agent: **MEYER, Michael; Philips Intellectual Property &  
Standards GmbH, WeissHausstr. 2, 52066 Aachen (DE).**
- (81) Designated States (unless otherwise indicated, for every  
kind of national protection available): **AE, AG, AL, AM,  
AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN,  
CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,  
GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE,  
KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD,  
MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  
PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM,  
TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM,  
ZW.**
- (84) Designated States (unless otherwise indicated, for every  
kind of regional protection available): **ARIPO (BW, GH,  
GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), Euro-  
pean (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR,  
GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK,  
TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW,  
ML, MR, NE, SN, TD, TG).**
- Published:**
- with international search report
  - before the expiration of the time limit for amending the  
claims and to be republished in the event of receipt of  
amendments
- (88) Date of publication of the international search report:  
**17 March 2005**
- For two-letter codes and other abbreviations, refer to the "Guid-  
ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: **METHOD TO DETERMINE THE SPATIAL DISTRIBUTION OF MAGNETIC PARTICLES AND MAGNETIC PAR-  
TICLE ADMINISTERING COMPOSITIONS**

(57) Abstract: The invention relates to a method to determine the spatial distribution of magnetic particles in an examination area of an object of examination with the following steps: a) Generating of a magnetic field with first sub-area with lower magnetic field strength and a second sub-area with a higher magnetic field strength, b) Change of the particularly relative spatial position of the two sub-areas or change of the magnetic field strength in the first sub-area so that the magnetization of the particles changes locally, c) Acquisition of signals that depend on the magnetization in the area of examination influenced by this change, and d) Evaluation of signals to obtain information about the change in spatial distribution and/or the movement of the magnetic particles in the area of examination. The invention further relates to a magnetic particle composition having improved imaging properties, to various different administering compositions for administering magnetic particles into an examination area and to methods for the administering of magnetic particles.

WO 2004/091394 A3

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/NB2004/050444

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 A61B5/06 A61K49/18

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 A61B A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4 827 945 A (JOSEPHSON LEE ET AL) 9 May 1989 (1989-05-09) column 7, line 49 - column 8, line 13 paragraph [06.1] paragraph [07.1]	14-22
X	WO 85/02772 A (SCHROEDER ULF; SALFORD LEIF G) 4 July 1985 (1985-07-04) page 5, line 35 - page 7, line 2	14-19
X	US 5 792 445 A (TOURNIER HERVE ET AL) 11 August 1998 (1998-08-11) column 2, line 59 - column 4, line 36	14-19
	----- -/--	

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "&" document member of the same patent family

Date of the actual completion of the international search

7 September 2004

Date of mailing of the international search report

12 01: 2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Lohmann, S

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/IB2004/050444

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	<p>SHEN L ET AL: "Aqueous magnetic fluids stabilized by surfactant bilayers"</p> <p>JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL,</p> <p>vol. 194, no. 1-3, April 1999 (1999-04), pages 37-44, XP004166644</p> <p>ISSN: 0304-8853</p> <p>cited in the application paragraph [0002]</p> <p>table 1</p> <p>-----</p>	<p>14-18,</p> <p>20-22</p>

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/IB2004/050444

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 1-13, 24-27, 31-33  
because they relate to subject matter not required to be searched by this Authority, namely:  
Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
1-22

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22

Encapsulation containing magnetic particles or administering composition comprising administering particles containing magnetic particles in a coating material which is easily removed and method using such particles.

---

2. claims: 23-28

Magnetic particle composition having a particular magnetization curve, magnetic particle formation kit and method of administering a magnetic particle composition.

---

3. claims: 29-33

(Aerosol) administering composition for administering of a magnetic particle composition, wherein the particles have a diameter below 100 micron.

---

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box II.1

Claims Nos.: 1-13, 24-27, 31-33

Rule 39.1(iv) PCT - Method for treatment of the human or animal body by surgery

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IB2004/050444

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 4827945	A	09-05-1989	US 4770183 A	13-09-1988
			AT 143604 T	15-10-1996
			CA 1301063 C	19-05-1992
			DE 3751918 D1	07-11-1996
			DE 3751918 T2	20-03-1997
			EP 0275285 A1	27-07-1988
			JP 1500196 T	26-01-1989
			NO 880931 A	02-03-1988
			US 5490991 A	13-02-1996
			WO 8800060 A1	14-01-1988
			US 5055288 A	08-10-1991
			US 5554386 A	10-09-1996
			US 5589591 A	31-12-1996
			US 5679323 A	21-10-1997
			US 5141739 A	25-08-1992
			US 5262176 A	16-11-1993
			US 5284646 A	08-02-1994
			US 5248492 A	28-09-1993
			US 5219554 A	15-06-1993
			US 5478576 A	26-12-1995
			US 5352432 A	04-10-1994
			US 5342607 A	30-08-1994
			US 5336506 A	09-08-1994
			US 5314679 A	24-05-1994
			US 4951675 A	28-08-1990
			US 5069216 A	03-12-1991
			US 5102652 A	07-04-1992
-----				
WO 8502772	A	04-07-1985	SE 463651 B	07-01-1991
			AT 38777 T	15-12-1988
			DE 3475269 D1	29-12-1988
			DK 377085 A ,B,	19-08-1985
			EP 0166755 A1	08-01-1986
			FI 853207 A ,B,	21-08-1985
			HK 134993 A	17-12-1993
			JP 3570650 B2	29-09-2004
			JP 9110727 A	28-04-1997
			JP 7055912 B	14-06-1995
			JP 61500786 T	24-04-1986
			NO 853270 A ,B,	19-08-1985
			SE 8307060 A	22-06-1985
			WO 8502772 A1	04-07-1985
			SG 85691 G	14-02-1992
			US 5618514 A	08-04-1997
			US 5670135 A	23-09-1997
			US 6544496 B1	08-04-2003
			US 5817291 A	06-10-1998
			US 6203777 B1	20-03-2001
			US 6153172 A	28-11-2000
-----				
US 5792445	A	11-08-1998	US 5653959 A	05-08-1997
			AT 124147 T	15-07-1995
			AT 221668 T	15-08-2002
			AT 180678 T	15-06-1999
			DE 69203004 D1	27-07-1995
			DE 69203004 T2	26-10-1995
			DE 69229358 D1	08-07-1999
			DE 69229358 T2	02-03-2000



- Information on patent family members

P01B2004/050444

Form PCT/ISA/210 (patent family annex) (January 2004)